Claims

[c1]   What is claimed is:

1. In a surveillance system comprising a master process-
ing system and one or more sensor systems, said sensor
systems being distributed throughout a surveillance area
and in communications with the master processing sys-
tem, a surveillance method comprising the steps of:

at the master processing system:

receiving, data streams from the sensor systems;

analyzing, the received data streams to determine char-
acteristics of a target situated within the surveillance
area; and

repeating, the above receiving and analyzing steps; and

at the sensor systems:

collecting, sensor specific stimulus (data);

pre-processing, the collected data;

applying, a matched extraction/compression scheme to
the pre-processed data; and

transmitting, the extracted/compressed data to the
master processing system.

[c2]   2. The method according to claim 1 wherein the applying
step comprises the steps of:

extracting, non-essential information from the pre-processed data; and

compressing, using a compression scheme that is matched to the extraction, the pre-processed data having the non-essential information extracted.

[c3]   3. The method according to claim 2, further comprising the steps of:

at the master processing system:

determining, based upon the analysis, whether additional information is to be provided by master processing system to a sensor system; and

sending, based upon the determination, any additional information from the master processing system to the sensor system.

[c4]   4. The method according to claim 1 wherein the transmitting from the sensor system to the master processing system is performed via a wireless communications link.

[c5]   5. The method according to claim 1, wherein each of the sensor systems include a sensor, responsive to sensor specific stimulus, said sensor being one selected from the group consisting of: acoustic, magnetic, seismic, chemical, and photonic sensors.

[c6]   6. The method according to claim 2 wherein said extrac-

tion and compression steps result in at least a 100:1 reduction in data.

[c7]   7. The method according to claim 1 wherein said pre-
processing step includes the step of:
converting, from an analog domain to a digital domain
through the action of an analog/digital converter, the
sensor specific data.

[c8]   8. The method according to claim 3 wherein said deter-
mination is made as a result of a particular type of target
surveiled.

[c9]   9. The method according to claim 2 further comprising
the steps of:
generating, a sparse array of sensor systems from the
one or more sensor systems distributed throughout the
surveillance area.

[c10]   10. The method according to claim 9 further comprising
the steps of:
modifying, the sparse array of sensor systems such that
a new sparse array is generated from the one or more
sensor systems distributed throughout the surveillance
area.

[c11]   11. Apparatus for the generic extraction and compres-
sion of information for surveillance to facilitate high per-

formance data fusion in distributed sensor systems, said apparatus comprising:

a master processing system for receiving and processing one or more data streams transmitted from one or more respective sensor systems distributed throughout a surveillance area; and

one or more sensor systems including:

a sensor, responsive to sensor-specific stimulus, producing a raw sensor data signal;

a pre-processor for processing the raw sensor data signal;

a matched, extractor/compressor for further processing the pre-processed signal;

a transmitter, for transmitting the further processed signal to the master processing system.

[c12]   12. The apparatus according to claim 11 wherein the pre-processor further comprises:
an analog/digital converter for converting analog raw sensor data signal to a digital signal representative of the raw sensor data.

[c13]   13. The apparatus according to claim 12 wherein the pre-processor further comprises:
one or more filters, for conditioning the digital signal.

[c14]   14. The apparatus according to claim 13, wherein the

extractor/compressor includes:

an extraction module, for extracting non-essential information from the conditioned digital signal; and

a compression module, for compressing the data signal having the non-essential information extracted;

wherein the matched extraction/compression is optimally matched to the specific sensor type.

[c15]   15. The apparatus according to claim 14 wherein the transmitter is a wireless transmitter.

[c16]   16. The apparatus according to claim 15 wherein each of the sensor systems include a sensor selected from the group consisting of: acoustic, magnetic, seismic, chemical, and photonic sensors.

[c17]   17. The apparatus according to claim 15 wherein the extractor/compressor produces at least a 100:1 reduction in data volume for transmission.